

AMENDMENTS TO THE CLAIMS

Please amend claims 1-14, cancel claims 15-20

Claim 1 (Currently Amended)

An open wireless architecture (OWA) for fourth generation mobile communications said system comprising:

- a) a wireless communication terminal device supporting various different wireless air interfaces in the same device with same unique identifier based on open Air-Interface BIOS (basic input/output system) architecture and capable of communicating with other devices, systems or networks through said open Air-Interfaces ~~a wireless medium,~~
- b) an open ~~advanced~~ computer system equipped with full networking facilities to access various different backbone networks either through wireline networking interfaces or through broadband wireless communication access systems of said open Air-Interfaces,
- c) an open ~~advanced~~ base transceiver system supporting various different air interfaces based on said open Air-Interface BIOS architecture to interconnect said wireless communication terminal device through said open Air-Interfaces ~~the air-link,~~
- d) said base transceiver system connecting to said computer system wirelinely to construct the open base-station as a whole,
- e) said wireless terminal device connecting to different wireline networks through its wireline Network Interface Unit (NIU) ~~networking interfaces~~ in the said wireless terminal device,
- f) said base-station connecting to other said base-station either over the wireline networks or over broadband wireless access system through said computer system, or ~~by over the air networks~~ through said base transceiver system of said open Air-Interfaces in an ad-hoc mode, and
- g) said wireless terminal device connecting directly to other said wireless terminal device through said open Air-Interfaces ~~the air-link~~ in an ad-hoc mode.

Claim 2 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of

claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) an open processing engine processing the signals and protocols of said open Air-Interfaces ~~various different air interfaces for over the air networking and transmission,~~
- b) a reconfigurable and open digital converter transforming the received analog signals to the digital base-band signals and vice versa, and connecting to said open processing engine,
- c) a programmable and open radio frequency (RF) module and smart antenna processing module of different frequencies supporting said open ~~different~~ air-interfaces, and connecting to said digital converter,
- d) a software definable module (SDM) containing parameters, algorithms and protocols of said open ~~some wireless~~ air-interfaces to be stored in an internal memory, external memory card or downloaded from networks, and
- e) an open wireless BIOS (basic input/output system) architecture ~~structure~~ capable of providing the common and open interfaces to said processing engine, said digital converter, said RF module and said SDM.

Claim 3 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) an open a system software module based on said open wireless BIOS architecture, supporting dynamic spectrum management, spectrum sharing and open resource management to increase spectrum efficiency and optimize the system performance and wireless transmission performance,
- b) an open a convergence layer module converging wireline and wireless networks and services, as well as transmission convergence of said open air-interfaces,
- c) an open a configuration management module enabling flexible system re-configuration when said open ~~wireless~~ air-interfaces changing, wireline networking changing or system settings changing.

Claim 4 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device comprising ~~capable of~~ system software, application software and real-time OS (operating system) running upon the system hardware ~~directly while the application software executing on the real-time operating system standards~~ through said open wireless BIOS.

Claim 5 (Currently Amended)

A system as recited in claim 2 wherein said open processing engine decodes, de-channelizes and demodulates the open base-band channel signals and control signals of said open ~~various~~ air-interfaces into detailed digital signaling, traffic and control information based on said open wireless BIOS architecture .

Claim 6 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured and re-programmed as wireless router, mobile soft switch or wireless gateway of said open air-interfaces based on said open wireless BIOS .

Claim 7 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured to be a mobile base-station for military applications or special industrial applications that the said computer system connecting to said ~~the~~ backbone networks through said broadband wireless communication ~~access~~ systems of said open air-interfaces based on said open wireless BIOS architecture instead of said wireline networking interfaces.

Claim 8 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device and said base-station can communicate each other over said open ~~various different~~ air interfaces including time-division multiple access (TDMA), code-division multiple access (CDMA), frequency-division multiple access (FDMA) or other user-defined interfaces based on said open wireless BIOS architecture.

Claim 9 (Currently Amended)

A method as recited in claim 8 detecting said open ~~various different~~ air-interfaces for said wireless terminal device and said base-station, said method comprising:

- a) performing initial channel processing from the received signals, ~~or~~
- b) scanning frequency carrier from the received signals, ~~or~~
- c) performing different decoding scheme from the received signals, ~~or~~
- d) performing different demodulation scheme from the received signals, and~~or~~
- e) calculating radio link parameters and models of said open wireless BIOS architecture
running user-defined detecting technologies.

Claim 10 (Currently Amended)

A system method as recited in claim 1 ~~connecting said transceiver system and said computer system through open software structures~~, wherein said base-station further comprising:

- a) open operating systems including supporting Windows, Linux or user-defined,
- b) open resource management including ~~covering~~ spectrum, bandwidth, channels, capacity, processors, power, storage and services,
- c) open communication application software enabling user-friendly programming and services,
- d) common objects library and functional components defining the converged processing elements and open interface parameters of said open wireless BIOS architecture ,
- e) open configuration management including supporting system reconfiguration in base-band parts, RF (radio frequency) parts, antenna parts, and networking parts and service parts.

Claim 11 (Currently Amended)

A system as recited in claim 2 wherein said open wireless BIOS further defining the basic interface structure for the said open ~~various different~~ air-interfaces, said open air-interfaces switching, said open system ~~functional~~ modules as well as switching between internal and external ~~said~~ open modules of said open air-interfaces .

Claim 12 (Currently Amended)

A method as recited in claim 2 utilizing said ~~providing a~~ smart antenna processing module for said wireless terminal device and said base-station ~~said OWA system~~, said method comprising:

- a) using antenna arrays to process radio signals of said open air-interfaces in both space and time to improve performance in presence of wireless fading and interference,
- b) using beamforming algorithm to increase received signal-over-noise-rate (SNR) for desired directions,
- c) using diversity algorithm to combat fading in order to work at less SNR,
- d) using interference mitigation method to maximally reuse the channel frequencies, and
- e) using spatial multiplexing algorithms to increase data speeds, for example, multiple-in and multiple-out (MIMO).

Claim 13 (Currently Amended)

A system as recited in claim 2 wherein said software definable module of said open air-interfaces in said wireless terminal device can be stored in or installed from said external memory card, or downloaded through said network interface unit (NIU) ~~from any available networking facilities~~ of said wireless terminal device.

Claim 14 (Currently Amended)

A ~~system method~~ as recited in claim 3 wherein said ~~providing a~~ convergence layer module for ~~said OWA system, said method~~ further comprising:

- a) open service convergence including service-oriented mobility infrastructure ~~transparent integrated services~~ across both wireline and wireless networks,
- b) open transport convergence including internet protocol (IP) enterprise convergence and All-IP end-to-end convergence, and
- c) open transmission convergence including adaptive modulation, adaptive coding and adaptive equalization of said open air-interfaces based on said open wireless BIOS architecture .

Claims 15-20 (Cancelled)